photolithographically processed layers. Active structure 20 comprises an active circuit component 26 extending in a horizontal direction printed on one layer which is overlapped on each end by trenches 24, 28 created on a different layer, either over or under the layer of component 26. Likewise, active circuit structure 22 comprises a similar active circuit component 32 which is overlapped and superimposed on each end by trench structures 30, 34 created on a different layer, on either over or under the layer of component 32. As shown in Fig. 1, the vertical or y-direction alignment of the trench structures with respect to each of the active components in active structures 20 and 22 appears to be within limits and, in any event, is relatively easy to discern because the edges of each active component and trench structure are clearly distinct.

However, in Fig. 2, there is shown a misalignment in the vertical or y direction (the direction of overlay error measurement) between each of the trenches and active components in each of the active structures 20 and 22. This misalignment makes the overlay error in the y direction difficult to discern because one must first locate the top and bottom edges of the trenches and the top and bottom edges of the active components in order to determine the midpoints of each, and then compare the midpoints to determine overlay error. The upper edge 28a and lower edge 28b of trench 28 must be identified and located in order to determine the midpoint 28c in the y dimension. Likewise, the upper edge 26a and lower edge 26b of active component 26 must be identified and located in order to determine the midpoint 26c. Because of the misalignment, it is difficult to distinguish the upper edge 28a of trench 28 from the upper edge 26a of active component 26. When attempting to measure overlay error directly from the active components themselves within the chip pattern, this will lead to difficulties.

In accordance with the present invention, kerf measurement features 20', 22' are formed in the kerf area adjacent to the circuit area which substantially correspond to and are representative of active features 20, 22, respectively, in the active circuit area. As shown in Fig. 3, the kerf measurement structures 20', 22' differ from the

corresponding active structures 20, 22 in that the active components 26', 32' are separated horizontally (the direction perpendicular to the error overlay measurement) from the trench components 28', 34'. This enables the edge and centerlines of each of the active component and trench structures to be more easily identified and distinguished. These edges and centerlines provide common points of reference for measuring separation, although other common points of reference may be used. While this is useful for the kerf measure structures of Fig. 3, which correspond to the relatively good alignment shown in Fig. 1, it is more important and advantageous for the kerf measurement structures in Fig. 4, which correspond to the misaligned active structures in Fig. 2. As shown in Fig. 4, it is considerably easier to discern and distinguish the edges, and therefore the centerlines, between the active component 26' on one layer and the trench 28' on another. As shown, the trench upper and lower edges 28'a, 28'b are easily discerned in order to calculate the centerline 28'c of the trench 28'. Likewise, the upper and lower edges 26'a and 26'b of the active component 26' are easily discerned in order calculate the active component centerline 26'c. It is then a relatively easy measurement, for example utilizing a high resolution instrument such as an SEM, to determine the overlay error between the respectively centerlines of the trench and active component in the kerf area, 28'c and 26'c.

Another example of the corresponding active circuit features and kerf measurement features is shown in Figs. 5-8. In Figs. 5 and 6, the active circuit feature 40 within the active circuit area comprises a contact hole 42 on one lithographically created layer superimposed over or under metal line 44 on another lithographically created layer. While the alignment of the two structures is acceptable in Fig. 5, in Fig. 6 the two structures are clearly misaligned, and it is difficult to discern the top edge of contact hole 42 from the top edge of metal line 44. As shown in Figs. 7 and 8, a corresponding kerf measurement structure 40' comprises a metal line 44' on the same lithographic layer as active metal line 44, and contact hole 42' on the same lithographic layer as active contact hole 42. In both Figs. 7 and 8, rather than being superimposed as in the active structure 40, the metal line 44' and contact

hole 42' are separated in the x direction, the direction perpendicular to the direction of measurement of overlay error. In Fig. 8, this separation is particularly useful because of the misalignment described previously in connection with Fig. 6. As shown in Fig. 8, the top and bottom edges 44'a and 44'b of metal line 44' are easily discerned to determine the centerline 44'c. Likewise the top and bottom edges 42'a and 42'b of contact hole 42' are easily discerned to determine the centerline 42'c. Subsequently the amount of overlay error may be determined by measuring the distance between centerlines 42'c and 44'c, shown by the two arrows.

A third example of the present invention is shown in Figs. 9-12 wherein an active device 50 is comprised of active structure 52 and metal line 54. As before, Fig. 9 shows a proper alignment between the two, made on different lithographic levels, whereas in Fig. 10, there is a misalignment between active component 52 and line 54. Because the edge of line 54 is near to the edge of the active component 52 it is difficult to discern the edges of the two features made on different levels in the active area depicted in Fig. 10. As shown in Figs. 11 and 12, corresponding kerf measurement structure 50' comprises an active component 52' and metal line 54'. Kerf measurement 54' is displaced from kerf measurement structure 52' in a horizontal direction (perpendicular to the direction of overlay error measurement), as compared to the relationship of active structure 52 and metal line 54 in the active circuit feature 50. Figs. 11 and 12 illustrate that the two kerf measurement features 52', 54' need not be physically separated, as was the case in Figs. 3, 4 and 7, but need only be displaced by some amounts so that their respective edges are easily discerned. As shown in Fig. 12, the misalignment of the active structure 50 shown in Fig. 10 is easily determined by first measuring the edges of kerf measure structure 52'a and 52'b, and determining the centerline 52'c of structure 52', and comparing that centerline to the that of centerline of 54'c of metal line 54'. Again, the overlay error is shown as the distance between the two arrows, and is in a direction perpendicular to the displacement of the two structures in the kerf measurement area compared to their relationship in the active circuit area.